Report of the Committee on

Fire Tests

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Omega Point Laboratories Incorporated, TX [RT]

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Jesse J. Beitel, Hughes Associates, Incorporated, MD [SE]
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Rep. American Hotel & Lodging Association
Robert G. Bill, Jr., FM Global, MA [I]
Rep. FM Global/FM Research
John A. Blair, The Dupont Company, DE [M]
Rep. Society of the Plastics Industry Incorporated
Gordon H. Damant, Inter-City Testing & Consulting Corporation of California, CA [SE]
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Alternates

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(Alt. to P. D. Gandhi)
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(Alt. to T. H. Talley)

Nonvoting

Robert H. Barker, American Fiber Manufacturers Association, VA [M]
(Alt. to T. L. Jilg)
Tod L. Jilg, Hoechst Celanese Corporation, NC [M]
Rep. American Fiber Manufacturers Association
Rohit Khanna, U.S. Consumer Product Safety Commission, MD [C]

Herman H. Spaeth, Novato, CA
(Member Emeritus)

Staff Liaison: **Gregory E. Harrington**

Committee Scope: This Committee shall have primary responsibility for documents on fire testing procedures, for reviewing existing fire test standards and recommending appropriate action to NFPA, for recommending the application of and advising on the interpretation of acceptable test standards for fire problems of concern to NFPA technical committees and members, and for acting in a liaison capacity between NFPA and the committees of other organizations writing fire test standards. This Committee does not cover fire tests that are used to evaluate extinguishing agents, devices, or systems.

This list represents the membership at the time the Committee was balloted on the text of this report. Since that time, changes in the membership may have occurred. A key to classifications is found at the front of the document.

The Technical Committee on **Fire Tests** is presenting two Reports for adoption, as follows:

Report I: The Technical Committee proposes for adoption, amendments to NFPA 271, **Standard Method of Test for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter**, 2001 edition. NFPA 271-2001 is published in Volume 7 of the 2002 National Fire Codes and in separate pamphlet form.

NFPA 271 has been submitted to letter ballot of the **Technical Committee on Fire Tests**, which consists of 25 voting members. The results of the balloting, after circulation of any negative votes, can be found in the report.

Report II: The Technical Committee proposes for adoption, a complete revision to NFPA 701, **Standard Methods of Fire Tests for Flame Propagation of Textiles and Films**, 1999 edition. NFPA 701-1999 is published in Volume 9 of the 2002 National Fire Codes and in separate pamphlet form.

NFPA 701 has been submitted to letter ballot of the **Technical Committee on Fire Tests**, which consists of 25 voting members. The results of the balloting, after circulation of any negative votes, can be found in the report.

701-1 Log #CP1 **Final Action: Accept**
(Entire Document (MOS))

Submitter: Technical Committee on Fire Tests

Recommendation:

Completely revise entire document to comply with the NFPA Manual of Style as follows:
1. Revise Chapter 1 to contain administrative text only.
2. Revise Chapter 2 to contain only referenced publications cited in the mandatory portions of the document.
3. Revise Chapter 3 to contain only definitions.
4. Revise so that all units of measure in document are converted to SI units with inch/pound units in parentheses.
5. Appendices are to be restructured and renamed as "Annexes."
6. All mandatory sections of the document must be evaluated for usability, adoptability, and enforceability language. Generate necessary committee proposals as shown (or indicate where shown).
7. Reword exceptions as requirements.
8. Single sentences per requirement.

Substantiation:

Editorial restructuring, to conform with the 2000 edition of the NFPA Manual of Style.

Committee Meeting Action: Accept

Revise NFPA 701 in its entirety in accordance with the NFPA Manual of Style as shown at the end of this report.

Committee Statement:

The draft revised NFPA 701 at the end of this report reorganizes the chapters and limits each numbered paragraph to one requirement in accordance with the NFPA Manual of Style. The changes contained in the draft are editorial only, and do not represent substantive, technical changes. Any technical changes resulting from other proposals will be incorporated into the document prior to its final production. Also note cross-references within the standard will be updated during the ROC (comment) stage.

Number Eligible to Vote: 25

Ballot Results: Affirmative: 24

Ballot Not Returned: 1 Griffith

701-2 Log #1 **Final Action: Accept in Principle**
(Chapter 1)

Submitter: Marcelo M. Hirschler, GBH International

Recommendation:

Revise text to read as follows:

1.1.1 Test Method 1.

1.1.1.1 Test Method 1 shall apply to fabrics or other materials used in curtains, draperies, or other window treatments. Vinyl-coated fabric blackout linings shall be tested according to Test Method 2.

1.1.1.2 Test Method 1 shall apply to single-layer fabrics and to multilayer curtain and drapery assemblies in which the layers are fastened together by sewing or other means. Vinyl-coated fabric blackout linings shall be tested according to Test Method 2.

1.1.1.3 For the purposes of Test Method 1, the terms curtains, draperies, or other window treatments, where used, shall include, but not be limited to, the following items:

(1) Window curtains
(2) Stage or theater curtains
(3) Vertical folding shades
(4) Roll-type window shades
(5) Hospital privacy curtains
(6) Window draperies
(7) Fabric vertical shades or blinds
(8) Horizontal folding shades
(9) Swags
(10) Fabric horizontal shades or blinds

1.1.1.4 Test Method 1 also shall apply to the following textile items:

(1) Table skirts
(2) Table linens
(3) Display booth separators
(4) Textile wall hangings

1.1.1.5 Test Method 1 shall not apply to fabrics or composites having an areal density greater than 700 g/m^2 (21 oz/yd^2). Test Method 1 shall not apply to solid materials with a thickness exceeding 3 mm (0.125 in.) and a specific gravity exceeding 1.2 kg/m^3.

Substantiation:

The NFPA 701 test method is intended, as the title indicates, for fabrics and films: "Flame Propagation of Textiles and Films". Therefore, it should be used mostly for "soft" products, as is also obvious from the list of products/materials included in the scope of the standard. Thus, it would be suitable for blinds or shower curtains made of fabric, or thin plastics or of "flexible PVC" (i.e., plasticized PVC) but not ones made of rigid plastics, including "rigid PVC" (unplasticized PVC). It is important to make this distinction clear in the text. Test method 1 of NFPA 701 is unsuitable for the type of solid plastic materials used in siding, appliance housing, pipe, duct, conduit, window profile or other thick hard plastics. These type of materials should be tested using a fire test method more specifically designed for them rather than a fire test method designed for fabrics and films.

The criteria chosen (thickness and specific gravity) should ensure the correct application. Fabrics and films (meaning thin films) and other such materials will not be excluded by those criteria.

Committee Meeting Action: Accept in Principle

Revise 1.1.1.5 and 1.1.2.1 as follows:

1.1.1.5 Test Method 1 shall not apply to ~~fabrics or composites~~ specimens having an areal density greater than 700 g/m^2 (21 oz/yd^2).

1.1.2.1 Test Method 2 (flat specimen configuration) shall be used for fabrics, including multi-layered fabrics, ~~and~~ films and plastic blinds, with or without reinforcement or backing, with areal densities greater than 700 g/m^2 (21 oz/yd^2).

Committee Statement:

The committee action clarifies Test Method 1 is NOT intended to be used for vinyl blinds. See also the committee action on Proposal 701-3 (Log #2). The action should meet the submitter's intent.

Number Eligible to Vote: 25

Ballot Results: Affirmative: 24

Ballot Not Returned: 1 Griffith

701-3 Log #2 **Final Action: Reject**
(Chapter 1)

Submitter: Marcelo M. Hirschler, GBH International

Recommendation:

Revise text to read as follows:

1.1.2 Test Method 2.

1.1.2.1 Test Method 2 (flat specimen configuration) shall be used for fabrics and films, with or without reinforcement or backing, with areal densities greater than 700 g/m^2 (21 oz/yd^2).

1.1.2.2 Test Method 2 shall be used for testing vinyl-coated fabric blackout linings and lined draperies using a vinyl-coated fabric blackout lining.

1.1.2.3 Test Method 2 shall be used for testing plastic films, with or without reinforcement or backing, when used for decorative or other purposes inside a building or as temporary or permanent enclosures for buildings under construction.

1.1.2.4 Test Method 2 shall apply to fabrics used in the assembly of awnings, tents, tarps, and similar architectural fabric structures and banners.

1.1.2.5 Test Method 2 shall not apply to solid materials with a thickness exceeding 3 mm (0.125 in.) and a specific gravity exceeding 1.2 kg/m^3.

Substantiation:

The NFPA 701 test method is intended, as the title indicates, for fabrics and films: "Flame Propagation of Textiles and Films". Therefore, it should be used mostly for "soft" products, as is also obvious from the list of products/materials included in the scope of the standard. Thus, it would be suitable for blinds or shower curtains made of fabric, or thin plastics or of "flexible PVC" (i.e., plasticized PVC) but not ones made of rigid plastics, including "rigid PVC" (unplasticized PVC). It is important to make this distinction clear in the text. Test method 1 of NFPA 701 is unsuitable for the type of solid plastic materials used in siding, appliance housing, pipe, duct, conduit, window profile or other thick hard plastics. These type of materials should be tested using a fire test method more specifically designed for them rather than a fire test method designed for fabrics and films.

The criteria chosen (thickness and specific gravity) should ensure the correct application. Fabrics and films (meaning thin films) and other such materials will not be excluded by those criteria.

Committee Meeting Action: Reject

Committee Statement:

It IS the committee's intent for vinyl blinds to be tested using Test Method 2. See also the action on Proposal 701-2 (Log #1).

Number Eligible to Vote: 25

Ballot Results: Affirmative: 23 Negative: 1

Ballot Not Returned: 1 Griffith

Explanation of Negative:

HIRSCHLER: I do not believe that NFPA 701 (even Test Method 2) is the appropriate test for materials that are rigid thick plastics. Such materials can have a significant heat content and potential for heat release and it is not assured that the ignition source in NFPA 701 is sufficiently severe.

701-4 Log #3 **Final Action: Accept in Principle in Part**
(Annex G)

Submitter: Marcelo M. Hirschler, GBH International

Recommendation:

Add new text to read as follows:
Annex G:
G.1 The following test method appeared in NFPA 701 until the 1989 edition. It was eliminated from the test method because it has been shown that materials that "pass" the test do not necessarily exhibit a fire performance that is. However, the test has the potential to be a screening test as a preliminary indication of fire behavior.
G.2 Conditioning: Conditioning of test specimens should be conducted as shown in 5.2 using the conditioning oven in 3.1.
G.3 Test Specimens:
G.3.1 The test method should be applicable to materials having an areal density smaller than 100 g/m^2 (3 oz/yd^2).
G.3.2 Five individual test specimens should be cut from a single piece of the material to be evaluated to a size of 89 mm ± 5 mm x 254 mm ± 5 mm (3.5 in. ± 0.20 in. x 10 in. ± 0.20 in.), with the length parallel to the lengthwise direction of the material. These 5 specimens should constitute a sample. Specimens should not be taken nearer the selvage than 1/10 of the full width of the textile. Each lot of 5 specimens should be cut from at least 5 places in the textile separated sufficiently to give indication as to the uniformity of the flammability performance.
G.4 Test Apparatus:
G.4.1 The test chamber, specimen holder and burner should be as specified in the Federal Children's Sleepwear Standard 16 CFR 1615.4 (FF 3-71).
G.4.2 The gas supply and control system should be as in 3.4.
G.4.3 The test apparatus should also include a hood (per Section 3.1), a timer capable of measuring to 0.5 seconds, a pan balance capable of measuring to the nearest 0.01 g, a specimen holder per G.4.3.1 and a hook and weight assembly per G.4.3.2.
G.4.3.1 Specimen holder: A metal holder having clamps applied to compress the holder lightly along its edges should be used to support and align the specimen. The ends of the specimen should remain free.
G.4.3.2 Hook and weight: A hook and weight assembly should be used to determine the length of char and the destruction of the specimen. The combined weight of the assembly should follow Table G1.
Table G.1: (to be converted to metric units also)
G.5 Test Procedure:
G.5.1 The specimens should be conditioned and weighed to the nearest 0.01 g prior to the flame test.
G.5.2 The specimens should be placed on the specimen holder and clamped so that a strip 51 ± 2 mm (2 ± 0.1 in.) wide and 254 ± 2 mm (10 ± 0.1 in.) long is left exposed.
G.5.3 The specimen and its holder should be supported within the test chamber so that its lower end is 19 ± 2 mm (0.75 ± 0.1 in.) above the top of the gas burner.
G.5.4 ...add the rest of the test method but not the pass fail criteria
G.10 Information: This test method should be used for screening purposes only and should not be used for qualification of materials. It has been extensively shown that materials can perform adequately in this test but have very poor fire performance in actual use applications.

Substantiation:

The test method is widely used in the textile industry and it is better to have it here in an appendix than to ignore it.

Committee Meeting Action: Accept in Principle in Part

Add a new Annex A Section A.1.1 as follows:
A.1.1 A small scale test method appeared in NFPA 701 until the 1989 edition. It was eliminated from the test method because it has been shown that materials that "pass" the test do not necessarily exhibit a fire performance that is acceptable. The test was not reproducible for many types of fabrics and could not predict actual full-scale performance. It should not, therefore, be used.

Committee Statement:

The committee agrees with the proposed added language describing the old 'small scale test,' however, rejects the addition of the old test criteria when it recognizes it doesn't work very well.

Number Eligible to Vote: 25

Ballot Results: Affirmative: 24

Ballot Not Returned: 1 Griffith

Comment on Affirmative:

GANDHI: Suggested wording for A.1.1 A small-scale test method appeared in NFPA 701 until 1989 edition. It was eliminated from the test method because it was not reproducible for many types of fabric and could not predict actual full-scale performance.